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ART UNIT	**PAPER NUMBER**
2122	25

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/888,361	Barson, Paul Colin et al
Examiner	**Art Unit**
Wilbert L. Starks, Jr.	2122

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Mar 5, 2001*.

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-6, 8, and 10-45* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-6, 8, 10-30, 34-40, 44, and 45* is/are rejected.

7) ☒ Claim(s) *31-33 and 41-43* is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
18) ☐ Interview Summary (PTO-413) Paper No(s). _____
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 05 MARCH 2001 have been fully considered but they are not persuasive.

Specification

2. The amendment filed 05 MARCH 2001 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

Claims 31, 32, 41, and 42 introduce an "accuracy measure" that was not previously disclosed.

Claims 33 and 43 introduce the re-training of the neural network, which was not previously disclosed.

Applicant is required to cancel the new matter in the reply to this Office action.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

the invention as disclosed in claims 1-6, 8, 10-23, and 30-39 is directed to non-statutory subject matter. While the claims are in the technological arts, they are not limited to practical applications in the technological arts.

Specifically, the claims are a series of steps to be performed on a computer, but they disclose ideas abstractly from any particular practical application.

To Constitutionally interpret the word "process", the Supreme Court has held that:

"*** A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. *** The process requires that *certain things* should be done with *certain substances*, and in a *certain order*; but the tools to be used in doing this may be of secondary consequence." (emphasis added) *Diamond, Commissioner of Patents and Trademarks v. Diehr and Lutton*, 209 USPQ 1, 6 (1981) quoting *Cochrane v. Deener*, 94 U.S. 780, 787-788 (1876).

This Constitutional interpretation of the word "process" is a long-standing one that the Supreme Court requires to be applied in interpreting 35 USC 101. *Diamond v. Diehr* at 6. Consequently, the use of that interpretation is *Constitutionally required* when we interpret the Federal Circuit's standard that a"new and useful *process*" is one that produces a "useful,

concrete, and tangible result". Cf. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 47 USPQ2d 1596, 1600-1601 (Fed. Cir. 1998).

Applicant discloses no "certain substances" that have been "transformed or reduced" in that Applicant's claims disclose no *specific* computer-readable medium, no manipulation of *specific* data representing physical objects or activities (pre-computer activity), nor do they disclose any *specific* independent physical acts being performed by the invention (post-computer activity).

The claims merely manipulate abstract ideas in general without limitation to a practical application where "certain substances" are transformed or reduced.

4. On this basis, claims 1-6, 8, 10-23, and 30-39 are rejected under 35 USC 101.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1-6, 8, 10-30, 34-40, and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt et al. (U.S. Patent Number 5,365,574; Dated 11/15/1994; Class 379; Subclass 88.02) in view of Gillick et al. (U.S. Patent Number 4,837,831; Dated 06/06/1989; Class 704; Subclass 245).

Claim 1

Hunt et al. Discloses the following aspects of the claimed invention:

Claim 1's "(i) storing information relating to the transmission of messages by the entity over a given time period, " is anticipated by Hunt et al col. 5, lin. 1-3, where it recites:

> "Random access memory ("RAM") **44** is connected to the CPU by bus **32** for providing temporary storage of data processed thereby."

Claim 1's "(ii) creating a signature comprising a plurality of parameters related to the transmission of messages over that time period wherein the parameters comprise at least one parameter related to the transmission of messages over a portion of the period and also related to the position of the portion in the period, to enable output data to be derived from the stored information;" is anticipated by Hunt et al col. 7, lin. 15-21, where it recites

> "In particular, as speech is input to the system 14, a feature extractor 60 extracts a set of primary features that are computed in real time **every 10 milliseconds**. The primary features include heuristically-developed time domain features (e.g., **zero crossing rates**) and frequency domain information such as Fast Fourier Transform ("FFT") coefficients."

Claim 1's "(vi) processing the signatures using the anomaly detector to derive the anomalies by detecting unexpected patterns in the transmission of messages by the entity over the time period." is anticipated by Hunt et al col. 8, lin. 9-54.

Claim 1's "(v) detecting anomalies by inputting the signatures to the anomaly detector; and" is anticipated by Hunt et al col. 8, lin. 9-54.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> Claim 1's "(ii) creating a second signature comprising a plurality of parameters related to the transmission of messages over a second period shorter than the first and more recent than the first;"
> Claim 1's "(iii) updating the first signature by a weighted averaging with the second signature;"

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 1.

Claim 2

Claim 2's "a method as claimed in claim 1 wherein the first signature is created in one of a plurality of possible formats." is anticipated by Hunt et al col. 8, lin. 10-46.

Claim 3

Claim 3's "a method as claimed in claim 2 wherein the format of the first signature comprises the length of the signature." is anticipated by Hunt et al col. 9, lin. 18-20 where it recites "d(i) is the resultant weighted Euclidean distance measure for the ith digit in the current password entry sequence." This is the Euclidean length of the vector.

Claim 4

Claim 4's "a method as claimed in claim 1 wherein said at least one parameter represents the number of events made in the portion of the first time period as a proportion of the total number of events made in the whole first time period." is anticipated by Hunt et al col .7, lin. 17-20.

Claim 5

Claim 5's "a method as claimed in claim 1 wherein said at least one parameter represents the number of events of a predetermined type made in the whole first time period as a proportion of the total number of events made in the whole first time period." is anticipated by Hunt et al col. 7, lin. 17-26.

Claim 6

Claim 6's "storing information about each of a number of events which occurred during the first time period;" is anticipated by Hunt et al col. 7, lin. 17-30.

Claim 6's "selecting attributes from this information; and" is anticipated by Hunt et al col. 7, lin. 17-30.

Claim 6's "converting the attributes into first said signature." is anticipated by Hunt et al col. 7, lin. 17-30.

Claim 8

Claim 8's "A method as claimed in Claim 1 wherein said anomaly detector comprises a neural network." is anticipated by Hunt et al col. 9, lin. 28-47; col. 7, lin. 64-68.

Claims 10, 11, 20, and 21

Hunt et al discloses the features of the claims 10, 11, 20, and 21, but Hunt et al does not expressly disclose the use of a predictive model.

Gillick et al discloses that the use of a predictive model produces a more accurate output.

> "frames comprised of linear **predictive coding parameters** can be used with the present invention instead of frames of spectral parameters" Gillick et al, col. 32, lin. 25-27.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the predictive model from Gillick et al in Hunt et al.

Motivation -- A more accurate output would have been a highly desirable feature in the detection art due to its efficiency and Gillick et al recognizes that a more accurate system would be expected when the predictive model of Gillick et al is substituted for the conventional signatures of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claims 10, 11, 20, and 21.

Claim 12

Hunt et al. Discloses the following aspects of the claimed invention:

Claim 12's "(i) a data store arranged to store information relating to the transmission of messages by the entity over a given time period," is anticipated by Hunt et al col. 5, lin. 1-3, where it recites:

> "Random access memory ("RAM") **44** is connected to the CPU by bus **32** for providing temporary storage of data processed thereby."

Claim 12's "(ii) an input arranged to receive information about each of a number of events which occurred during the time period;" is anticipated by Hunt et al col. 7, lin. 14-16.

Claim 12's "(iv) an anomaly detector;" is anticipated by Hunt et al col. 7, lin. 35-41.

Claim 12's "(v) an input arranged to provide the signatures to the anomaly detector, and " is anticipated by Hunt et al col. 7, lin. 30-35.

Claim 12's "(vi) wherein the anomaly detector is arranged to process the signatures to derive the anomalies by detecting unexpected patterns in the transmission of messages by the entity over the time period." is anticipated by Hunt et al col. 7, lin. 30-41.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> "(ii) a processor arranged to convert the information into a signature comprising a plurality of parameters related to the transmission of messages over the time period wherein the parameters comprise at least one parameter related to the transmission of messages over a portion of the period and also related to the position of the portion in the period, to enable output data to be derived from the stored information and wherein said processor is further arranged to convert at least part of

> the information into a **second signature**, comprising a plurality of parameters related to the transmission of messages over a second period, shorter than the first and more recent than the first; and also to **update** the first signature by a **weighted averaging** with the second signature;"

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data

would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 12.

Claim 13-19 and 22

Hunt et al discloses the conventional use of neural networks to detect anomalies in voice data.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature.

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claims 13-19 and 22.

Claim 22

Claim 22's "an input arranged to receive information about the transmission of messages by the entity;" is anticipated by Hunt et al col. 7, lin. 15-17.

Claim 22's "an anomaly detector; " is anticipated by Hunt et al col. 8, lin. 9-67.

Claim 22's "an input arranged to provide the signatures to the anomaly detector, and wherein said anomaly detector is arranged to process the signatures to derive the anomalies by detecting unexpected patterns in the transmission of message by the entity over the time period." is anticipated by Hunt et al col. 8, lin. 9-67.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> "a processor arranged to create a first signature comprising a plurality of parameters related to the transmission of messages over a predetermined first time period and to create a second signature comprising a plurality of parameters related to the transmission of messages over a second period shorter than the first and more recent than the first;" is anticipated by Hunt et al col. 7, lin. 15-17.
>
> "a processor arranged to calculate a weighted averaging of the first and second signatures to form an updated first signature;" is anticipated by Hunt et al col. 7, lin. 64-68.

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 22.

Claim 23

Claim 23's "(i) creating a first signature comprising a plurality of parameters related to the associated telephone calls over that time period," is anticipated by Hunt et al col. 7, lin. 15-21, where it recites

> "In particular, as speech is input to the system 14, a feature extractor 60 extracts a set of primary features that are computed in real time **every 10 milliseconds**. The primary features include heuristically-developed time domain features (e.g., **zero crossing rates**) and frequency domain information such as Fast Fourier Transform ("FFT") coefficients."

Claim 23's "(iv) inputting the signatures to the anomaly detector; and " is anticipated by Hunt et al col. 8, lin. 9-54.

Claim 23's "(v) processing the signatures using the anomaly detector to derive the potentially fraudulent telephone calls by detecting unexpected patterns in the telephone calls associated with the entity over the time period." is anticipated by Hunt et al col. 8, lin. 9-54.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> (ii) creating a second signature comprising a plurality of parameters related to the associated telephone calls over a second period shorter than the first and more recent that the first;
> (iii) updating the first signature by a weighted averaging with the second signature;

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 23.

Claim 24

24. A method as claimed in claim 23 wherein the first signature is created in one of a plurality of predetermined possible formats." is anticipated by Hunt et al col. 7, lin. 17-26.

Claim 25

25. A method as claimed in claim 24 wherein the format of the first signature comprises the length of the signature." is anticipated by Hunt et al col. 9, lin. 18-20 where it recites "d(i) is the resultant weighted Euclidean distance measure for the ith digit in the current password entry sequence." This is the Euclidean length of the vector.

Claim 26

26. A method as claimed in claim 23 wherein at least one parameter of the first signature is related to the transmission of messages over a portion of the period and also related to the position of the portion in the period." is anticipated by Hunt et al col. 7, lin. 15-21, where it recites

> "In particular, as speech is input to the system 14, a feature extractor 60 extracts a set of primary features that are computed in real time **every 10 milliseconds**. The primary features include heuristically-developed time domain features (e.g., **zero crossing rates**) and frequency domain information such as Fast Fourier Transform ("FFT") coefficients."

Claim 27

27. A method as claimed in claim 26 wherein said at least one parameter represents the number of events made in the portion of the first time period as a proportion of the total number of events made in the whole, first time period." is anticipated by Hunt et al col .7, lin. 17-20.

Claim 28

28. A method as claimed in claim 26 wherein said at least one parameter represents the number of events of a predetermined type made in the portion of the first time period as a proportion of the total number of events of the same type made in the whole first time period." is anticipated by Hunt et al col. 7, lin. 17-26.

Claim 29

29. A computer system for detecting potentially fraudulent telephone calls from telephone calls associated with an entity over time, the system comprising:

Claim 29's "(i) an input arranged to receive information about the telephone calls associated with the entity;" is anticipated by Hunt et al col. 7, lin. 15-21, where it recites

> "In particular, as speech is input to the system 14, a feature extractor 60 extracts a set of primary features that are computed in real time **every 10 milliseconds**. The primary features include heuristically-developed time domain features (e.g., **zero crossing rates**) and frequency domain information such as Fast Fourier Transform ("FFT") coefficients."

Claim 29's "(iii) an anomaly detector;" is anticipated by Hunt et al col. 8, lin. 9-54.

Claim 29's "(iv) an input arranged to provide the signatures to the anomaly detector; and wherein said anomaly detector is arranged to process the signatures to derive the potentially fraudulent telephone calls by detecting unexpected patterns in the telephone calls associated with the entity over the predetermined time period." is anticipated by Hunt et al col. 8, lin. 9-54.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> (ii) a processor arranged to create a first signature comprising a plurality of parameters related to the telephone calls over a predetermined first time period and to create a second signature comprising a plurality of parameters related to the telephone calls over a second period shorter than the first and more recent than the first; and wherein the processor is arranged to calculate a weighted averaging of the first and second signatures to form an updated first signature;

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 29.

Claim 30

Claim 30's "(i) monitoring traffic flowing in the network," is anticipated by Hunt et al col. 8, lin. 9-54.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> Claim 30's "(ii) generating a normal historic signature and a stored historic signature each representative of network usage over a first time period,
> Claim 30's "(iii) generating a current signature representative of network usage over a second time period which is shorter and more recent than the first time period,
> Claim 30's "(iv) determining whether the current signature represents normal usage by comparing it with the normal historic signature,
> Claim 30's "(iv) if the current signature is determined to represent normal usage, producing an updated stored historic signature by combining the stored historic signature and the current signature using a weighted averaging procedure so that consistent trends present in the current signature are gradually over time introduced into the longer term trends incorporated in the stored historic signature,
> Claim 30's "(vi) providing an indication of anomalous network usage if the present usage as represented by the current signature deviates from that represented by the normal historic signature by more than a predetermined amount."

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 30.

Claim 34

Claim 34's "A method according to claim 30, wherein the network is a telecommunications network and the traffic flowing in the network is selected form the group of voice and data traffic." is anticipated by Hunt et al, Title.

Claim 35

Claim 35's "A method according to claim 30, wherein the network is a cellular mobile telecommunications network and the traffic flowing in the network includes traffic flowing between a mobile station and a base station forming part of the network." is inherent in Hunt et al, Title because cellular phones are *by definition* devices that operate over the phone network -- that is why it is called *cellular* -- PSTN elements that are called "cell sites" connect these phones to the PSTN via wireless connection.

Claim 36

Claim 36's "A method according to claim 30, wherein the current, historic and stored historic signatures are generated by parsing and analysing call data records (CDR) in a telecommunications network." is anticipated by Hunt et al, claim 1, where it recites:

> "1. A method for enabling a caller to obtain access to one or more services via a telephone network by speaking a password having a plurality of characters, comprising the steps of:
>
> establishing at least one predetermined threshold value for a speaker verification signal;

generating first and second sets of parameters for each spoken character using a voice recognition feature transformation and a voice verification feature transformation, respectively, the first sets of parameters for use in a voice recognition system and the second sets of parameters for use in a voice verification system;

recognizing the password using the first sets of parameters;

following entry of the password, using the second sets of parameters to generate a speaker verification signal for the password;

adjusting the predetermined threshold value upon a predetermined call condition;

determining whether the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value; and

if the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value, accepting the caller's identity."

Claim 37

Claim 37's "A method according to claim 30, wherein each current signature and each historic signature is associated with an individual network user." is anticipated by Hunt et al, claim 1, where it recites:

"1. A method for enabling a caller to obtain access to one or more services via a telephone network by speaking a password having a plurality of characters, comprising the steps of:

establishing at least one predetermined threshold value for a **speaker verification signal**;

generating first and second sets of parameters for each spoken character using a voice recognition feature transformation and a voice verification feature transformation, respectively, the first sets of parameters for use in a voice recognition system and the second sets of parameters for use in a voice verification system;

recognizing the password using the first sets of parameters;

following entry of the password, using the second sets of parameters to generate a speaker verification signal for the password;

adjusting the predetermined threshold value upon a predetermined call condition;

determining whether the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value; and

> if the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value, accepting the caller's identity."

Claim 37 is further anticipated by Hunt et al, col. 12, lin. 35-38

> "...the voice recognition algorithm **48** could alternatively be **speaker-dependent** instead of speaker-independent as described in the preferred embodiment."

Claim 38

Claim 38's "A method according to claim 30, comprising training a neural network to recognise the difference between current signatures which represent normal and anomalous usage of the network." is anticipated by Hunt et al col. 9, lin. 28-47; col. 7, lin. 64-68.

Claim 39

Claim 39's "A method according to claim 30, wherein the step of comparing present usage with the current and historic signatures is carried out by at least one pre-trained neural network." is anticipated by Hunt et al col. 9, lin. 28-47; col. 7, lin. 64-68.

Claim 40

Claim 40's "(i) a traffic data input arranged to receive traffic data representative of traffic flowing in the network," is anticipated by Hunt et al col. 8, lin. 9-54.

Hunt et al, however, does not expressly disclose the updating of the first signature by making a weighted average with a second updating signature disclosed as follows:

> Claim 40's "(ii) a historic signature generator arranged to process the traffic data and to generate a normal historic signature and a stored historic signature each representative of network usage over a first time period,
>
> Claim 40's "(iii) a current signature generator arranged to process the traffic data to generate a current signature representative of network usage over a second time period which is shorter and more recent than the first time period,
>
> Claim 40's "(iv) an anomaly detector arranged to determine whether the current signature represents normal usage by comparing it with the normal historic signature and further arranged to produce an updated stored historic signature by combining the stored historic signature and the current signature using a weighted averaging procedure so that consistent trends present in the current signature are gradually over time introduced into the longer term trends incorporated in the stored historic signature, if the current signature is determined to represent normal usage, and
>
> Claim 40's "(v) an anomaly output arranged to provide an indication of anomalous network usage if the anomaly detector determines that present network usage as represented by the current signature deviates from that represented by the normal historic signature by more than a predetermined amount."

Gillick et al discloses in claim 5 that the use of an updating step that uses a weighted average between the longer historical signature with a shorter updating signature produces a weighted composite signature of the time series data:

> "...said comparing includes deriving a series of smoothed frames from said sequence of individual frames, each of said smoothed frames being derived from a **weighted average of a plurality of individual frames**, and comparing at least one of said smoothed frame against said cluster models" (emphasis added.)

The prior art reference did not limit the relative sizes of the time frames in the claim, so the broadest reasonable interpretation of the art encompasses the use of a longer historical signature and a shorter updating signature.

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to use the updating method from Gillick et al in Hunt et al.

Motivation -- The ability to more heavily weight certain portions of the historical signature data would have been a highly desirable feature in the recognition art due to its ability to allow one to pay more attention to more relevant time periods in the signal and Gillick et al recognizes that the ability to more heavily weight certain portions of the historical signature data would be expected when the updating method of Gillick et al is substituted for the conventional signature of Hunt et al.

Therefore, it would have been obvious, to one of ordinary skill in the art, to combine Gillick et al with Hunt et al to obtain the invention as specified in claim 40.

Claim 44

44. A method according to claim 40, wherein the traffic data are call data records (CDR) in a telecommunications network." is anticipated by Hunt et al, claim 1, where it recites:

> "1. A method for enabling a caller to obtain access to one or more services via a telephone network by speaking a password having a plurality of characters, comprising the steps of:
>
> establishing at least one predetermined threshold value for a speaker verification signal;
>
> generating first and second sets of parameters for each spoken character using a voice recognition feature transformation and a voice verification feature transformation, respectively, the first sets of parameters for use in a voice recognition system and the second sets of parameters for use in a voice verification system;
>
> recognizing the password using the first sets of parameters;

following entry of the password, using the second sets of parameters to generate a speaker verification signal for the password;

adjusting the predetermined threshold value upon a predetermined call condition;

determining whether the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value; and

if the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value, accepting the caller's identity."

Claim 45

45. A method according to claim 40, wherein the historic and current signature generators are arranged to associate each respective current signature and historic signature with an individual network user." is anticipated by Hunt et al, claim 1, where it recites:

"1. A method for enabling a caller to obtain access to one or more services via a telephone network by speaking a password having a plurality of characters, comprising the steps of:

establishing at least one predetermined threshold value for a **speaker verification signal;**

generating first and second sets of parameters for each spoken character using a voice recognition feature transformation and a voice verification feature transformation, respectively, the first sets of parameters for use in a voice recognition system and the second sets of parameters for use in a voice verification system;

recognizing the password using the first sets of parameters;

following entry of the password, using the second sets of parameters to generate a speaker verification signal for the password;

adjusting the predetermined threshold value upon a predetermined call condition;

determining whether the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value; and

if the speaker verification signal for the password has a predetermined relationship with respect to the adjusted threshold value, accepting the caller's identity."

Claim 45 is further anticipated by Hunt et al, col. 12, lin. 35-38

> "...the voice recognition algorithm **48** could alternatively be **speaker-dependent** instead of speaker-independent as described in the preferred embodiment."

Conclusion

7. In the Remarks, Applicant argues, in substance, that:

I.

> "The Examiner has rejected all the pending claims as being obvious in view of Hunt and Gillick. It is noted that both of these prior art documents are **concerned only with voice recognition** over a telecommunications network whereas the present invention as recited explicitly in all of the pending and new claims is **concerned with the detection of anomalies which are often defined as irregular or abnormal occurrences (such as fraudulent activity).** Thus the prior art cited by the Examiner is concerned with recognizing patterns in digitized data streams representing speech which is in absolute contrast with the present invention which is concerned with detecting irregularities or abnormalities (i.e. disruptions in patterns) in an otherwise normal sequence of messages. Thus not only is the prior art cited by the Examiner in a different technical field to that of the present invention but it teaches the reverse of the present invention. The skilled artisan would see no connection whatsoever between time and frequency domain analyses of digitized voice data and the detection of anomalies such as fraud in a sequence of messages."

Examiner disagrees. The prior art is concerned with the detection of *unauthorized access* on the network. Hunt et al., col. 2, lin. 14-25 discloses the following:

> "In a preferred embodiment, these and other objects of the invention are provided in a method for enabling a caller to obtain access to services via a telephone network by entering a spoken password having a plurality of digits. Preferably, the method begins by prompting the caller to speak the password beginning with a first digit and ending with a last digit thereof. Each spoken digit of the password is then recognized using a speaker-independent voice recognition algorithm. Following entry of the last digit of the password, a determination is made whether the password is valid. If so, **the caller's identity is verified using a voice verification algorithm**."

Furthermore, Hunt et al., col. 2, lin 62-68; col. 3, lin. 1-6 discloses

> "**The voice verification routine** is controlled by the digital processor and is responsive to a determination that the password is valid **for determining whether the caller is an authorized user**. This routine includes transformation means that receives the speech feature data generated for each digit and the voice verification feature transformation data and in response thereto generates voice verification parameter data for each digit. A verifier routine receives the voice verification parameter data and the (speaker-relative) voice verification class reference data and in response thereto **generates an output indicating whether the caller is an authorized user**."

Since unauthorized access is not a normal use of the network, it is well within Applicant's definition of "anomalies" cited above. Specifically, Applicant defines "anomalies" as "irregular or abnormal occurrences." Unauthorized access in the network is clearly not a *normal, intended use* of the network. It is an "abnormal occurrence" and clearly is an "anomaly" as defined by Applicant.

II.

> "Examiner's assertion that the word "entity" as used in claims 1, 12 and 13 is the use of the word abstract from any particular attributes is respectfully traversed. The "entity" as recited in these claims has the ability to transmit messages over a given time period and thus it has the attributes of being able to transmit for longer than an instant. The transmission of messages is a technical occurrence and furthermore is a concrete occurrence.
> The Examiner comments that it is not clear what entity is limited to. It is noted that in for example the State Street Bank case it was considered appropriate to limit the claims to **financial transactions.** It was appropriate in that case because the State Street Bank invention was itself related to financial transactions. The present invention has applications **for example** in credit card fraud and fraudulent use of telecommunications equipment."

Examiner disagrees. *In re Warmerdam* is within the *Alappat -- State Street Bank -- AT&T* line of cases. The standard used by the Federal Circuit in that case is binding on Examiner's

actions. The fact that the transformation of "discrete dollar values" was held to be statutory does not allow for the transformation of *abstract "entity" data* to be statutory.

Applicant calls the "transmission of messages" a "technical occurrence" and is, therefore statutory. Examiner finds no "technical occurrence" element in Federal Circuit or Supreme Court doctrine on 101. The discoveries of natural phenomena or of mathematical properties are also "technical occurrences", but warrant absolutely no patent protection. Information transmission, in the abstract, is purely a mathematical endeavor, as evidenced by the vast, seminal body of work created by the very, very well known mathematician Claude Elwood Shannon. Applicant's argument is unpersuasive.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Wilbert L. Starks, Jr. whose telephone number is (703) 305-0027. Alternatively, inquiries may be directed to Supervising Patent Examiner Mark Powell whose telephone number is (703) 305-9703.

WLS

May 17, 2001

MARK R. POWELL
SUPERVISORY PATENT EXAMINER
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